Alliance OF AUTOMOBILE MANUFACTURERS

July 20, 2010

Karl Simon
Director, Compliance and Innovative Strategies Division
U.S. EPA Office of Transportation and Air Quality

Ariel Rios Building
1200 Pennsylvania Avenue, N. W.
**Mail Code:** 6405J
Washington, DC 20460
*-- Delivered via email --*

**RE: Request for approval of new scheduled maintenance under §86.1834-01(b)(7)(ii)) for Model Years 2011 and 2012**

Dear Mr. Simon:

The Alliance of Automobile Manufacturers (Alliance) requests that EPA reapprove as new scheduled maintenance the refill of DEF at service intervals (oil change intervals) for Model Years 2011 and 2012.

On November 9, 2009 (74 Fed Reg 57671), EPA granted approvals to Alliance requests for a new scheduled maintenance for the refill of Diesel Exhaust Fluid (DEF) for Selective Catalytic Reduction (SCR) technologies and use of the service interval (oil change interval) as the proper DEF refill interval, for Model Years 2009 and 2010.

Since that November 2009 approval, SCR technology and the urea infrastructure have continued to develop and mature. DEF is more broadly and readily available and more vehicle manufacturers have introduced light duty vehicle models with SCR technology. However, the core characteristics of SCR and DEF have not changed and it continues to remain technologically necessary to replenish the SCR system with DEF at intervals shorter than 100,000 miles.

The allowable DEF refill interval should continue to be set at the service interval (oil change interval) due to space constraints with packaging of the DEF tank and due to the negative impacts to fuel economy and performance from adding weight to the vehicle. A DEF refill interval set at the oil change interval results in a DEF tank size which addresses the packaging and weight challenges on the vehicle, achieves a reasonable maintenance interval for drivers, and coincides with the widely known oil change interval.

Therefore, the Alliance requests that EPA reapprove the scheduled maintenance interval of DEF refill for light duty and chassis certified vehicles up to 14,000 GVWR for Model Year 2011 and 2012 that coincides with the manufacturer's service interval (oil change interval).

The following is further detailed substantiation for this request:

This request is for maintenance which did not exist prior to the 1980 model year. We recommend that the maintenance category for DEF refill be emission-related, critical maintenance. We further recommend that, for Model years 2011 and 2012, the technologically necessary SCR maintenance interval (i.e., DEF tank refill interval) be set the same as the service interval (oil change interval) in miles.

**1) <u>Reasons for why DEF refill is an emission-related, critical maintenance</u>**

EPA noted in CISD 07-07 that since the SCR catalyst does not function without the use of a reducing agent, 40 CFR §86.1834-01(b)(4)(ii)(F) and §86.004-25(b)(4)(iii)(F) would apply to the SCR catalyst and all of the associated hardware, including but not limited to the reducing agent, the reducing agent storage tank, the dosing valve, and all lines and hoses. We agree with EPA that DEF refill is an emission-related, critical maintenance.

**2) <u>Reasons for why the technologically necessary SCR maintenance interval should be the same as the service interval for Model Years 2011 and 2012</u>**

The reasons for why the technologically necessary SCR maintenance interval should be set the same as the service interval (oil change interval) are: vehicles will be designed and equipped to ensure vehicle compliance with emission standards; DEF will be readily available and accessible to drivers; maintenance is likely to be performed; there are engineering constraints on packaging a large DEF tank on light duty vehicles; and there is a significant penalty on fuel economy and performance associated with carrying both a larger DEF tank and the weight of a large quantity of DEF.

**a) Vehicles will be designed and equipped to ensure compliance with emissions standards**

**i) Driver Warning**

Manufacturers will equip vehicles with an escalating audible and visual warning chain that provides adequate time to re-fill the DEF. USCAR has developed a recommended practice for manufacturers to use as a standardized warning chain. This warning chain has also been adopted as an SAE industry-wide recommended

practice. SAE has also standardized the DEF indicator symbol. Manufacturers will use an escalating mix of DEF level indicator, messages in the instrument cluster, engine shutdown lamp, or audible warnings to warn the driver of low DEF levels.

**ii) Driver Inducement**

Manufacturers will equip vehicles with escalating and sufficiently onerous levels of inducement to ensure that the DEF is refilled. This escalating inducement also includes identification of incorrect reducing agent.

**iii) Tamper Resistant Design**

Manufacturers will design the SCR system to be tamper resistant consistent with the EPA's March 27, 2007 guidance letter. The actions listed below will trigger illumination of a warning lamp:

- Disconnected DEF tank level sensor
- Blocked DEF line or dosing valve
- Disconnected DEF dosing valve
- Disconnected DEF pump
- Disconnected SCR wiring harness
- Disconnected NOx sensor (that is incorporated with the SCR system)
- Disconnected DEF quality sensor

**iv) Freeze Protection**

Manufacturers will design and equip vehicles with DEF Dosing Freeze Protection Systems which will prevent or minimize SCR performance degradation due to freezing of DEF. This can include DEF tank heaters, line heaters, and location of tank within a heated space.

**b) DEF will be readily available and accessible to drivers**

**i) DEF is available at dealerships, gas stations and truck stops**

The manufacturers of SCR vehicles have worked with franchised dealerships to supply DEF to their customers. Several of these manufacturers have agreements with gasoline station chains to ensure availability of DEF at those refill stations. In addition, many companies have announced publicly their intention to stock DEF. (For an up-to-date and complete list please see the *Recent News & Headlines* section at http://www.factsaboutscr.com/.)

To further ensure the quality of DEF at these retail locations, the American Petroleum Institute is administering a DEF quality control program with the support of distributor and retailer licensing agreements. (http://www.apidef.org/)

**ii) An organized industry-wide SCR Stakeholder Group is ensuring wide availability of DEF**

DEF infrastructure development is making significant progress. Industry-wide standards for DEF infrastructure, a necessary enabler for the widespread availability of DEF, have been put in place, including ISO DEF specifications, API's DEF quality standard, SAE DEF specifications, and USCAR and SAE warning chain

standards. The SCR Stakeholder Group has established itself as a focal point for infrastructure development discussions by EPA, DOE, DEF producers, suppliers, distributors and users of DEF.

**iii) Drivers can locate DEF through DOE's NREL locator website**

DOE/NREL has established a locator website (http://www.afdc.energy.gov/afdc/locator/def/) for drivers to use to locate supplies of DEF. Over 5,000 locations are included on the locator website. Other companies are also creating DEF locator websites which will be available to the public.

**iv) Public awareness of availability is increasing through DEF public relations activities**

Numerous press releases and public relations activities have been distributed related to the development of DEF infrastructure. (For an up-to-date and complete list please see the *Recent News & Headlines* section at http://www.factsaboutscr.com/.)

**c) Maintenance is likely to be performed on schedule**

There are a number of reasons why the DEF refill maintenance is likely to be performed. Vehicles will be equipped with an escalating warning chain which will audibly and visually signal that the maintenance needs to be performed. In the unlikely event that the warnings are not heeded and the maintenance is not performed, the performance of the vehicle will be noticeably and significantly degraded.

**d) Engineering constraints with packaging preclude packaging of a large quantity of DEF on light duty vehicles**

It is impractical to equip light duty vehicles with a DEF tank(s) sufficient in size to achieve the 100,000 mile scheduled maintenance requirement. The amount of space required for such a DEF quantity would make the vehicle uncompetitive and less marketable.

Light duty vehicles are constrained in the amount of space that can be dedicated to a DEF tank. In addition to the DEF tank, SCR vehicles must package an SCR catalyst, SCR mixer and DEF dosing and heating mechanisms. For example, one SCR light duty vehicle in current production (BMW 335d) provides 6.1 gallons of DEF to achieve the DEF refill interval set at the oil change interval. Assuming a 6 gallon to 10,000 mile oil change interval ratio, to be able to accommodate a 100,000 mile scheduled maintenance requirement would require 60 gallons of DEF. The space required to accommodate such a DEF quantity would be approximately 8 cubic feet (60 gallons times 0.1337 gallons per cubic foot), which is three-quarters of the entire trunk volume of the vehicle (12 cubic feet). This would also be almost equivalent to installing 4 extra fuel tanks (in addition to the existing fuel tank of 16.1 gallons). To reduce the existing usable volume to such an extent would result in an uncompetitive vehicle in terms of usable passenger or cargo volume.

In addition to the DEF tank(s), vehicles must also package the SCR catalyst, SCR mixer and DEF dosing and heating mechanisms. The space required for these additional catalysts and devices, as well as their packaging requirements (e.g., heat transfer requirements from the SCR catalyst), limit the locations and space available in the undercarriage for use for increased DEF capacity.

e) **The fuel economy and performance penalty is significant with large DEF volume**
It is impractical for light duty vehicles to carry the weight of a DEF tank sufficient in size to achieve the 100,000 mile scheduled maintenance requirement. The addition of such a weight to a light duty vehicle would significantly reduce the fuel economy and the performance of the vehicle.

The weight of such a DEF quantity would be 540 lbs (60 gallons times 9 lbs per gallon) using the example above. This is in addition to the weight of the actual DEF tank(s) itself, mountings and necessary chassis or suspension reinforcements to support the increased weight. According to the EPA and DOE website Fueleconomy.gov (http://www.fueleconomy.gov/feg/lightweight.shtml), for every 10% of weight eliminated from a vehicle's total weight, fuel economy improves by seven percent. Using this ratio, the addition of 540 lbs to a 3800 lb curb weight vehicle would reduce fuel economy by 9.8%.

Also, the handling performance (acceleration, braking, turning) and the available passenger space, cargo carrying and/or towing capacity of the vehicle would be negatively affected. The combination of reduced fuel economy and reduced vehicle performance would result in an uncompetitive vehicle which is less marketable.

For these reasons, the Alliance requests that EPA reapprove the scheduled maintenance interval of DEF refill for light duty and chassis certified vehicles (up to 14,000 GVWR) for Model Year 2011 and 2012 that coincides with the manufacturer's service interval (oil change interval).

Sincerely,

Giedrius Ambrozaitis
Director, Environmental Affairs

cc: Linc Wehrly, Compliance and Innovative Strategies Division
Laura Baker, Compliance and Innovative Strategies Division